

A dramatic, high-contrast photograph of a person with a large, shaggy brown wig and face paint. The person is holding a knife with a curved blade. The image is dark and moody, with a focus on the person's face and the knife. The text "Leica PHOTOGRAPHY" is overlaid in the top right corner.

# Leica

*PHOTOGRAPHY*

1958 • Number 3 • 40¢





# Leica

## PHOTOGRAPHY

VOLUME 11 • NUMBER 3 • 1958

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The editors are happy to consider original articles on photography with the Leica and photographs taken with Leica cameras and lenses. All manuscripts and photographs should be accompanied by stamped, self-addressed return labels.



### COVER

#### Brian Brake

This pagan tribesman on a peaceful mission appeared with other painted clansmen of the central plateau of Nigeria to welcome Queen Elizabeth II on her 1955 tour. Brake, contributor of this issue's one-man show, caught this portrait of dignity and power with a handheld M-3, 125mm Hektor and Visoflex. Exposure was about 1/50 second at f/5 on Kodachrome.

### INSIDE COVER

#### John Knapp

These clubmosses, genus *Selaginella*, look as if they're related to conifers, but are actually related to ferns. Knapp, who says, "I try to find patterns in almost everything," used a Visoflex and Hektor 135mm in short focusing mount with extension tubes on his Leica. Exposure was about two seconds at f/32.



## one-man show

BRIAN BRAKE, photojournalist

It was only a short time after Brian Brake turned to 35mm photography that he was asked to join Magnum by Henri Cartier-Bresson.

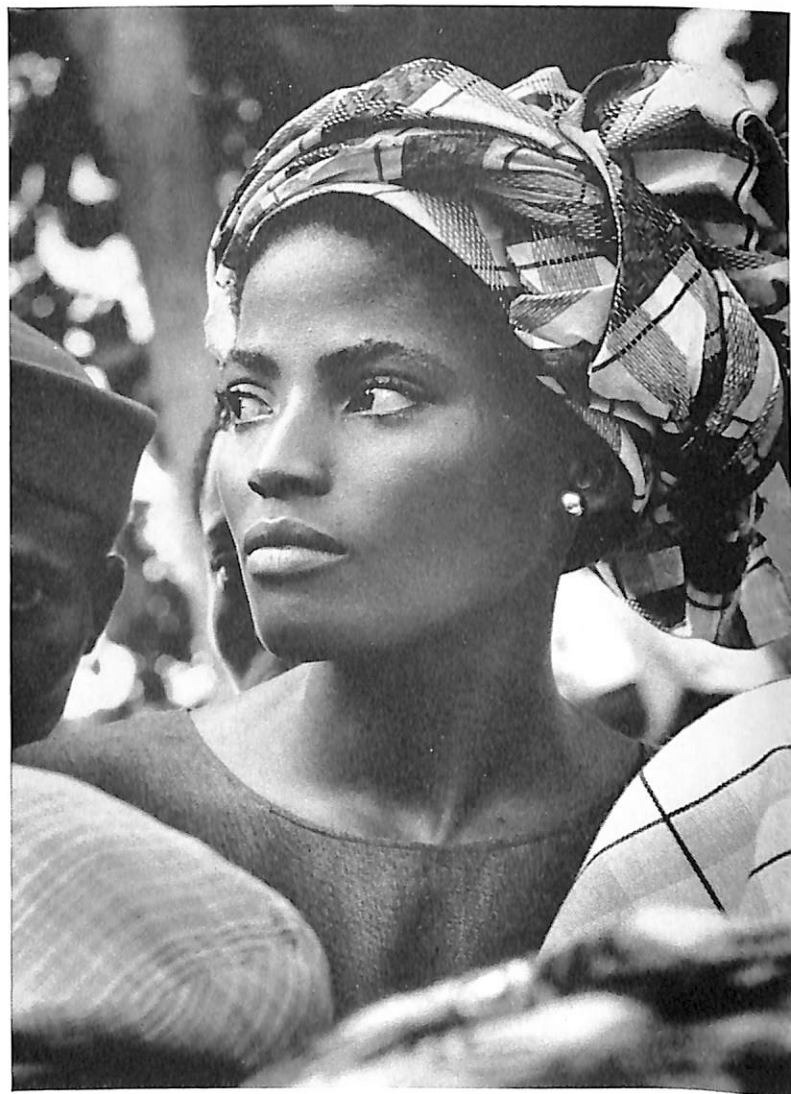
This recognition by the master of the "decisive moment" approach is an eloquent comment on Brake, a master in his own right of this approach. Brian Brake did not burst upon the world of 35mm photography like a comet, however. Like "overnight stars" in many fields, who actually have had many years of training, Brake had a formidable apprenticeship. Born in New Zealand in 1927, he went from school at the age of 18 to full-time work in a portrait studio in Wellington. He spent five years gaining comprehensive experience in darkroom, retouching and lighting techniques, and as a cameraman. He left portraiture to join the New Zealand National Film Unit, where he had five years experience in black-and-white and color cinematography. His films "Snows of Aorangi" and "Snowline Is Their Boundary" secured awards in international film festivals. He traveled to England in 1954. Staffers at Ernst Leitz GmbH in Wetzlar, Germany, are very proud that they introduced Brake to Cartier-Bresson and Ernst Haas. Soon afterwards, Brake was invited to join Magnum, cooperative association of 18 top-flight photographers who work all over the world out of offices in New York and Paris. His equipment consists of three Leica M-3 bodies and a full range of Leitz lenses up to 400mm. He uses one body for color and another for black-and-white; and all three when he is doing a news story and carrying lenses of different focal lengths. The lenses he uses, in order of preference, are: 50mm, 35mm, 125mm. He says, "This is a purely personal matter and each photographer arrives at his own particular choice by experience." He uses Ilford HP3 and HPS, developed in Microphen, and Kodachrome for color.

Brake's pictures, his sensitivity to content and form, his superlative technique, speak for themselves. However, he is extremely articulate about photography, and his comments, which follow, round out a portrait of a man dedicated to his work.

(On influences) "In portraiture there was Karsh; in motion pictures there was Flaherty and Sucksdorff; and in my present work the influence of Cartier-Bresson is paramount.

"Apart from purely photographic things my in-

*Appearing here from time to time:  
selections from the finest work of  
photographers in different fields.*



**Nigerian Beauty** in a crowd. M-3, 125mm Hektor.

fluences since coming to England from New Zealand have mostly come from friends who work in other media—painters, for example—and from the civilizing atmosphere of Europe.

"There were two important turning points in my career: first, the change from portraiture to documentary films which was caused by the realization





**Woman Walking** with burden. Mukalla, southern shore of Arabian peninsula. M-3, 50mm.

of the futility of the art of flattery; second, the change from cinema back to stills—but with a new awareness of people around me.

“In still photography I find I am able to express my feelings about people and the way they live, much more directly than is possible with motion pictures. The still photograph does not require special conditions before it can be viewed. In this sense it is more

permanent because it can be seen at any time.

“A photograph is not only the record of a scene but also the photographer’s opinion about the scene. The purpose of technique is to enable the photographer to catch whatever moment he chooses with the minimum of difficulty. He must therefore know the capabilities of his camera, lenses and film so well that he does not have to think at all about how to use them.”

**Poling Barges** in the canals of Srinagar, Kashmir, India. M-3, 50mm.





**Pablo Picasso**, his son, and Jean Cocteau at bullfight. Valauris, southern France. M-3, 125mm Hektor.

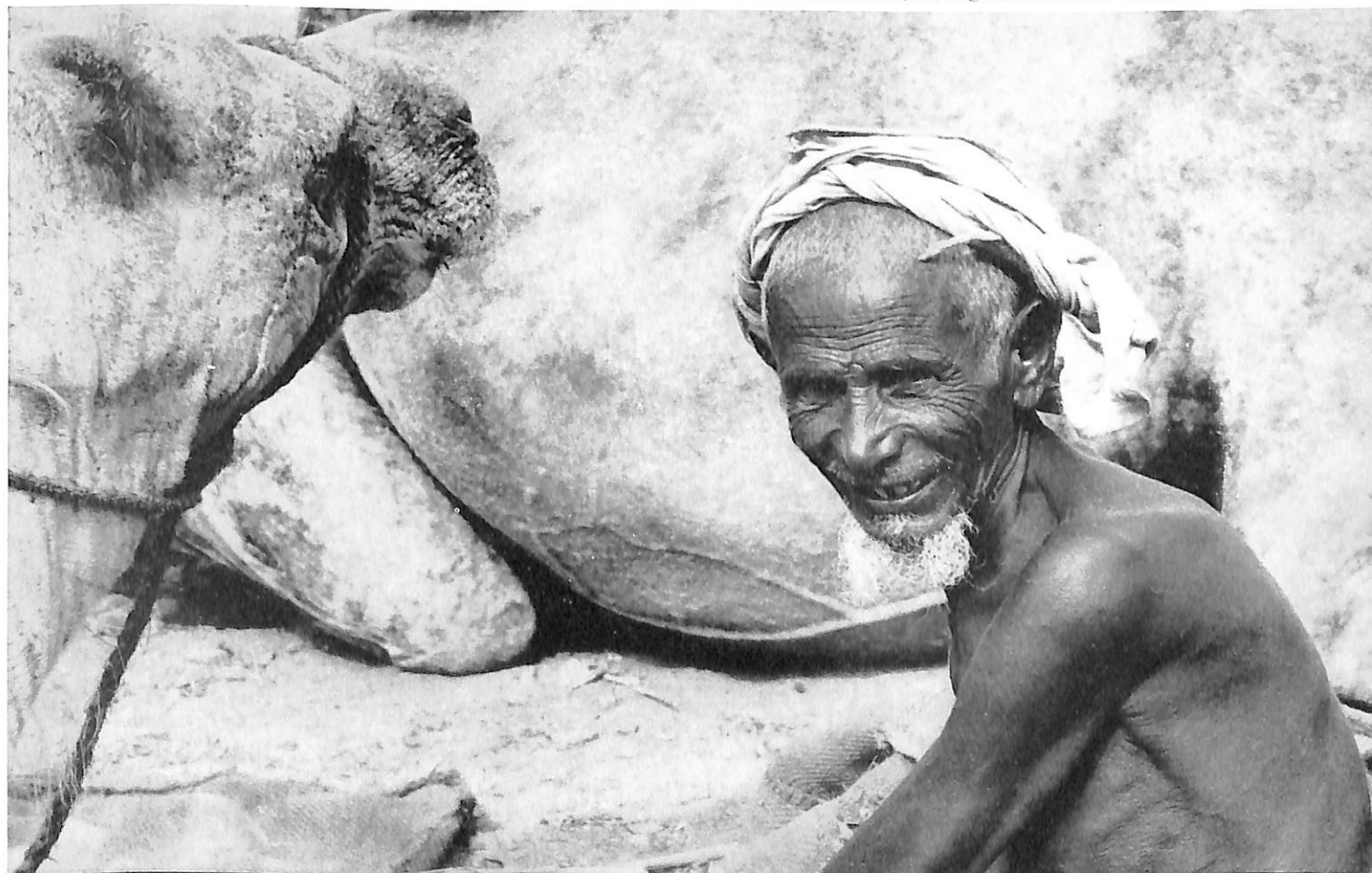




**Camel Statues** along road to Ming Tombs outside Peking. M-3, 50mm.

**one-man show** (*contd.*)

**Camel Driver** with real camels, resting at Mukalla. M-3, 90mm.





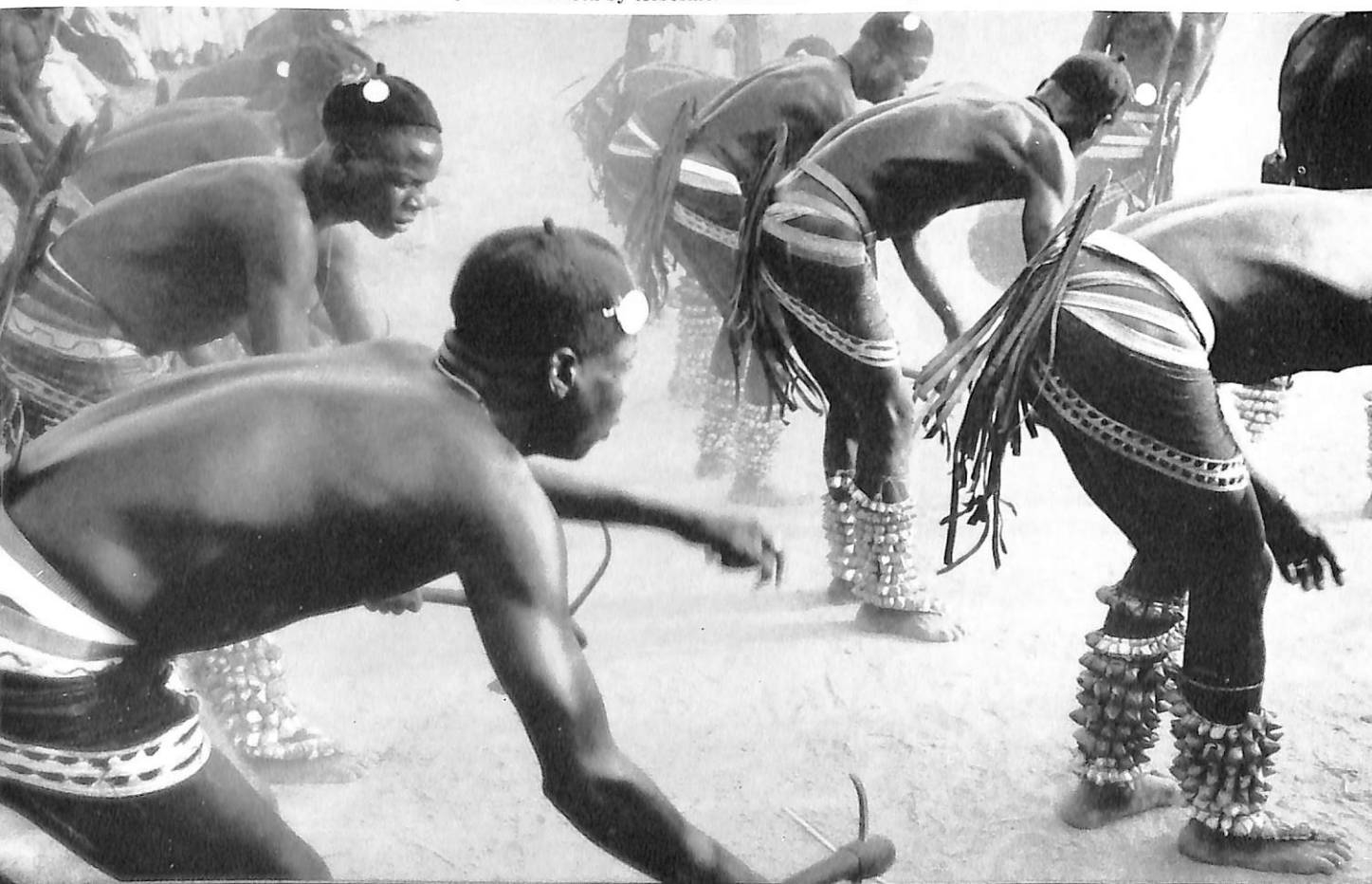
**Chemical Plant** at night. Imperial Chemical Industries, England. Available light. M-3, 125mm Hektor.



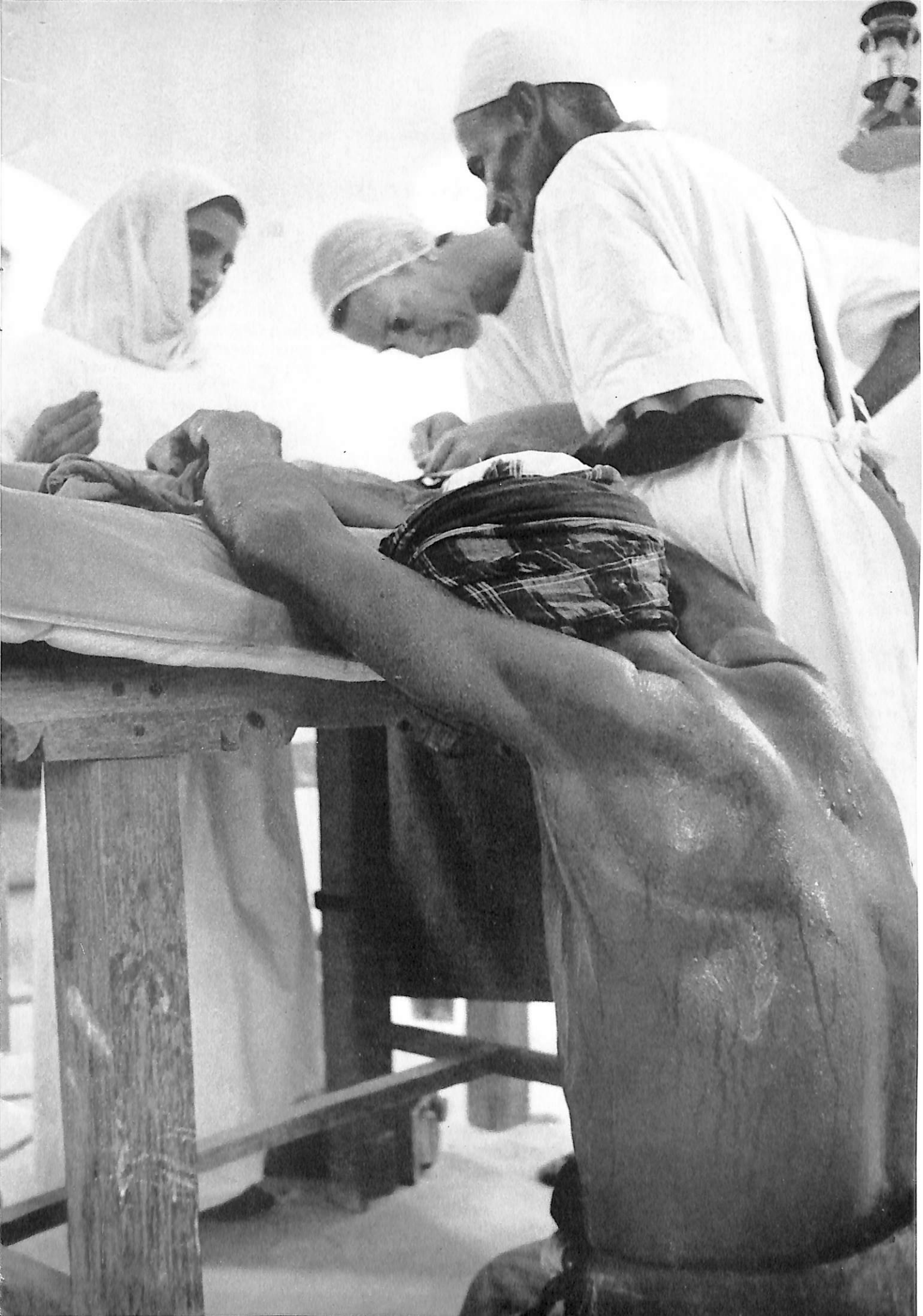
**Duke of Edinburgh** on Malayan tour. Penang Island. M-3, 200mm Telyt.

**one-man show** (contd.)

**Dance of Welcome** for Queen Elizabeth by tribesmen from the North. Nigeria. M-3, 50mm.







**Emergency Operation.** Native holds hand of girl relative undergoing operation for skull fracture with local anesthesia only, after fall into well. German woman doctor was only European in city. Operation was successful. Shibam, southern Arabia. M-3, 50mm.

## basic composition in photography / Edmond J. Golden

### how to compose without "rules"

The discovery that a favorite photograph is also a fine composition is one of the greatest joys to the beginner. Most likely, however, it is accidental, or at best, planned only in the enlarging stage. With just basic familiarity with elements of composition, the newcomer to photography can easily take much of the *chance* out of "just shooting" and turn his occasional successes into planned certainties. Once you are genuinely aware of composition, your pictures will improve. Composition is a tool for your photography—every bit as much as your exposure meter. There are generalities galore written about composition. But it is also a strongly individual matter. And with this in mind, the following remarks are offered to alert those who do not yet regard it as a tool. These ideas may even provide a fresh point of view for those who have always considered composition a tool.

Composition can become instinctive. There are as many approaches to composing photographs as there

are photographers to shoot them and the individual photographer will vary his approach as each problem presents itself. Your problem is—what statement are *you* trying to make? Photography is not a copy of nature but an interpretation of it as seen by the photographer. You should "see" not only with your eyes, but also with your mind, calling on your experiences and emotions to see more critically. The more critically or sensitively you see, the more directly can you communicate your ideas or feelings through your statement—the photograph. Composition gives form to this statement.

#### visual logic

In all media of communication symbols follow in logical order to make a statement; so in a photograph, with all of its parts seen simultaneously, you must establish some order to make a *visual* statement logical and clear. Using the elements of composition at

*"Timeless subject becomes meaningful visual experience through wealth of interest in composition. Eye is directed in many ways from farmer to geese to rice paddy to background to foreground. Interest in the geese is subtly relieved as the eye is directed up by vertical sprouts in water, across by lines of background." E.J.G.*



Ken Heyman



your disposal you can make *your* statement the way *you* feel it should be made.

What then is composition? It is nothing more than organization—simply the relationship of the parts to the unified whole, within the established format of the viewfinder. Composition is that relationship between line and mass which is the essence of creative selectivity. As a photographer (unlike a painter), you normally cannot build your composition—you *select* it. Composition begins with the act of selecting a subject and organizable elements which will enable you to compose an effective statement.

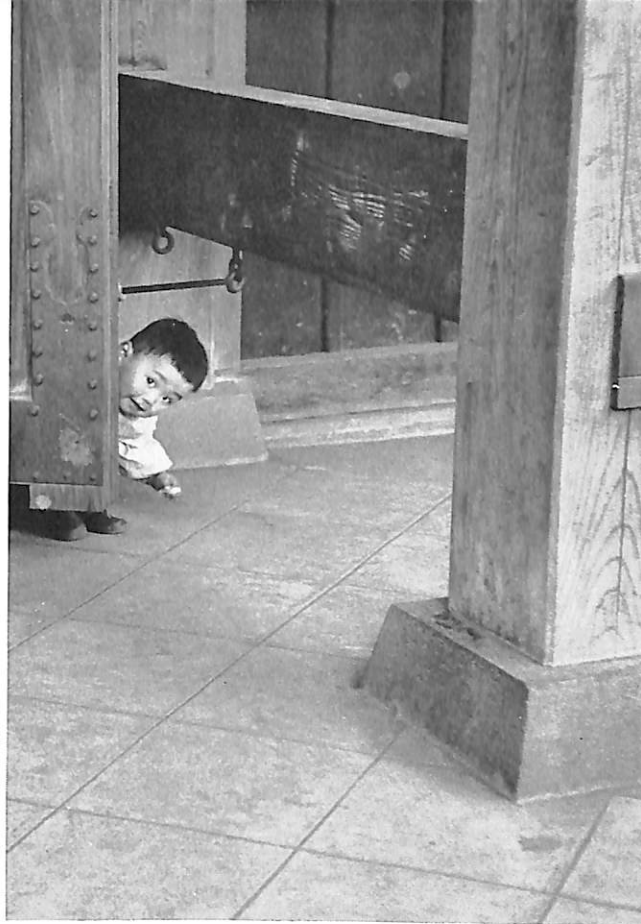
What are these elements?

**1. point of view**—The point from which the picture is seen—the point from which, by comparison, you will establish all lines, planes and directions within the picture—the base from which you view your subject. Choose carefully—it's from this point that you can best establish the character of your subject. Look sharply to determine, "From what angle can I make the viewer see it and react to it as I feel it?" Shoot high for one character or mood, shoot low to establish another. An angular shot may show your subject best—walk around it, find interest, a focal point, then establish your format.

**2. format**—The shape and proportion of a composition. All lines, shapes and directions will be influenced by the format and will relate to it. Has your point of view dictated that your subject will look best as a vertical "structure" or is it to be horizontal? Use your full negative and relate subject to format.

**3. center of interest**—The subject need not (indeed, rarely should) fall into the *center* of the composition, but all the interest will center on it. The eye must have something to focus on, the mind something to concentrate on. The major use of all the elements of composition is to clarify the center of interest—to amplify it—to comment on it. Be sure it is worthy of all this attention and concentration—a center of real *interest*.

**4. balance**—Pictorial balance is essential. Visually, just as physically, balance is the state of distribution where everything has fallen into equilibrium. In a balanced composition, all elements—such as subject, line, mass, direction, contrast—are dependent on each other in such a way that no change is possible. In composing, you may place an object or figure against the open expanse of sky, field, sand or sea; yet despite the overwhelming dominance of the larger areas, the composition will balance if the subject is positioned to hold our attention. You must balance to create order out of disorder. On the other hand, while disorder is confusing, order alone is monotonous without relief. This relief can be achieved by balance-



*"Photographer selected strong composition in which large heavy regular areas contrast with and accent soft roundness of the boy subject. Each plane leads into center of interest. Each line leads the eye to others which in turn force the eye to the boy. Weight of surroundings and asymmetric placement accent timidity of peeping boy." E.J.G.*

ing a minor element against a dominant one—a light area against dark, rough against smooth, vertical against horizontal, etc. This contrast, the very basis of photography, becomes your most valuable compositional tool.

**5. contrast**—We are able to see because of light and the resultant contrasts. The contrasts enable us to take a picture. The degree of contrast will help the viewer to read and understand your composition. Using contrast in lighting, interest, activity, size, shape, direction, mass, etc., will enable you to establish a mood or tone in the right "key" to give your photograph the "feeling" you desire.

Having selected a point of view and format, and established the center of interest, the fundamentals are out of the way. Thinking in terms of balance and contrast, you are already "composing"—thinking in *abstract* terms! Let's get even more abstract:

The composition, of course, falls within the limited field of the format. In this field of vision you can *see* at one time only a limited number of visual elements. Your mind, through your eye, is able to *relate* only a limited number of elements. Confronted with a complex composition, you will instinctively reduce it to its most basic relationships. These visual elements tend to be seen together, forming larger units.



Claude Beaumont

*"Making this photo almost startling are skills—knowing where to stand, how to plan the shot ahead of time and respond quickly enough to shoot at the precise moment when composition appears in the action. Tension between the dancers is heightened by the distance between them. Larger figure forms an arrow pointing to other figure. Background tends to stop the backward travel of the eye, stopping it from going out of the picture, as it might because of leg pointing that way. Here there is no line, only shape, mass and distance." E.J.G.*

Instantly we organize and group these visual units. This "organizing" of visual relationships is more basic than the recognition of the objects themselves. It is this organizing that causes our eyes to travel within the framework of the composition—that causes our eyes to pick up the center of interest, the subject.

Let's see how this happens:

In visual experience, the "nearness" of visual units is the simplest condition for the organization of groups. Visual units close to each other, within a format, tend to be seen together. Your eye comprehends them easily. Nearness, however, can give way to other factors of organization. We also tie elements into "stable" relationships if they have common qualities. Equal sizes, similar shapes, and corresponding values, textures and lines also tend to be seen as

units. The "nearness" and "similarity" elements of composition may be considered alike in character. In photographs, we see that these nearness and similarity elements create much cohesion, forming strong linear structures within a composition.

#### **motion in lines**

Every linear element has motion. It tends to be continued in the same direction and with the same movement. A straight line is seen in its continuation as a straight line; a curve continues as a curve; a wavy line has continuing rhythm. This "linear continuation" helps to form the composition by creating simple groups which can be comprehended at the instant of vision.

Confronted with a complex composition the eye searches for the simplest form with the greatest stability. A closed form appears as more stable than one which is open and without boundaries. The eye searches for such stability and completes the form where it is only implied. Each form leads beyond itself and implies a larger whole. These "larger wholes" form with other groups and this forming and reforming continues until all possible relationships are exhausted or the limit of interest is reached.

We cannot look at the static composition long without losing interest. The composition is a living experience. To remain alive the relationships within it must be constantly changing. Our eyes and mind must be fed on changing rhythmic relationships. Only this changing variety can give the stimulation to hold attention.

You must have attention to be heard. If what you have to say is worth hearing, use every element at your command to get attention and hold it. Your photographic composition is a statement—what *you* have to say—the product of *your* eyes and mind. The more familiar you become with the elements of "story-telling," the better you can tell your story.

Why, then, all the academic discussion on optics and the physiology involved in looking at pictures? Why the concentration on the fundamentals of vision? Only to make you aware of them as tools, to help you to shoot fine photographs *instinctively*, "feeling" the essence of a visual experience. Henri Cartier-Bresson has said, "In photography, visual organization can stem only from a developed instinct."

It is no mystery that things not beautiful to ordinary vision can be made beautiful in photographs. It is nothing more than a question of composition; but the most important element in that composition is far beyond the scope of this or any article. That element is the integration of your own vision, your own emotion, your own instinct.



## in the field with the news photographers

Milt Freier

### lecturing professionals and learning from them

In May, 1957, E. Leitz, Inc. set up a new Press Technical Service. The company knew that many news photographers were turning to 35mm cameras for new freedom in their picture-taking, but that the cameramen had a lot of technical questions about their small cameras and negatives. So, Leitz had asked me to direct the new Service. I had eighteen years of news photography (sixteen of them with the United Press in Washington, D. C.) behind me. I had been one of four U.P. photographers regularly assigned to cover the White House, and it had taken a really challenging job to make me switch from this coveted job to a new photographic field. But this new Leica service promised just such a challenge.

I had been a Leica man for some time, so my new work was to involve something dear to my heart. I had consistently advanced the idea that 35mm cameras are excellent newspaper visual reporting tools. I had covered both 1956 national political conventions with a Leica. And even while I was still with U.P., the President's news conferences were being photographed with "35." This strengthened my conviction that I was seeing the beginning of a new era in news photography.

As director of the Leitz Press Technical Service, I visit newspapers all over the country; I counsel and trouble-shoot for news photographers new to 35mm. And I find myself busier with each passing month as more and more news cameramen take up the small camera and start to ask questions about it. I have answered hundreds of such questions, because newsmen have problems peculiar to their particular craft.

#### how 35mm meets deadlines

For instance, the one big ever-present problem of the daily newspaper is the deadline. Virtually every news photographer who admits that 35mm photography does produce more interesting news pictures, still asks: "But what if you have a hot spot-news picture and 'deadline' is minutes away? How can you get quality FAST out of 35mm?" Here's one answer:

Did you know you can develop 35mm film in straight paper developer at seventy degrees—agitating it constantly—for exactly one minute and come up with good quality negatives and enlargements without objectionable grain? The real secret is that the film must be properly exposed.

Using Eastman Kodak Plus-X film, I take a meter

reading at an exposure index of 160 to 200, with Kodak Tri-X, 320, and with Adox KB-21, 160.

These exposure ratings are not designed for paper developer processing only. I rate films the same way when I develop them in other medium fine-grain developers. But proper exposure becomes more crucial with a one-minute developer. Recommended film ratings almost invariably give heavy negatives which are not conducive to obtaining optimum results. And, needless to say, you must not be careless with your developing time and temperature. Ten seconds could mean the difference between a normal and over-developed negative. Try it. You'll be amazed!

Ethol UFG (*Leica Photography*, Vol. 10, No. 1) is a film developer whose virtues I discovered as a U.P. photographer. I found it in my search for a developer fast enough to help my 35mm shots compete with 4x5 cut film when covering a Presidential news conference across from the White House.

We had been using a 4x5 cut film camera with a fifteen inch (380mm) lens. We had to stop down to f/8 and simply pray the President would not sway too far forward or back—otherwise he would be out of focus. Sometimes we missed good pictures because of this.

UFG was indeed a discovery! I could process my 35mm negatives for the same length of time that cut film was being "souped" in DK60-A—our regular film developer. Yet, permission to shoot with 35mm was denied. "We can't take chances with such an important assignment!" I was told. Presidential news conferences usually take place around 11 a.m., and afternoon newspapers already have their first editions on the street. They try to hold later editions to



MILT FREIER lectures professionals at E. Leitz, Inc.

include story and pictures based on news emanating from these conferences. The pressure on "getting out the picture" is immense.

A few months later I shot another Presidential news conference. But this time I shot both 4x5 and "35." An understanding lab man kept track of the time it took to get a print on the picture transmitter from a 4x5 negative (less than 10 minutes). I came into the lab and ran through my 35mm negatives as if actually facing afternoon deadlines.

The result? We actually had a print from a wet negative ready to roll a minute and a half sooner than the cut film efforts earlier in the day!

The answer was obvious. The biggest time lag was in transferring cut film sheets from film holders into developing racks and then placing the batch into the developer. As for my 35mm film, one 20-exposure roll was wound onto a Nikor reel and developed for normal time—4½ minutes at 70 degrees. The quality was better because of normal development.

The advantages at the press conference? I was able to shoot wide-open, consequently at a faster shutter speed. I could follow-focus as the President moved. Thus I stopped action and came up with sharper pictures. Today, all news conferences are photographed with 35mm, thanks in large part to UFG.

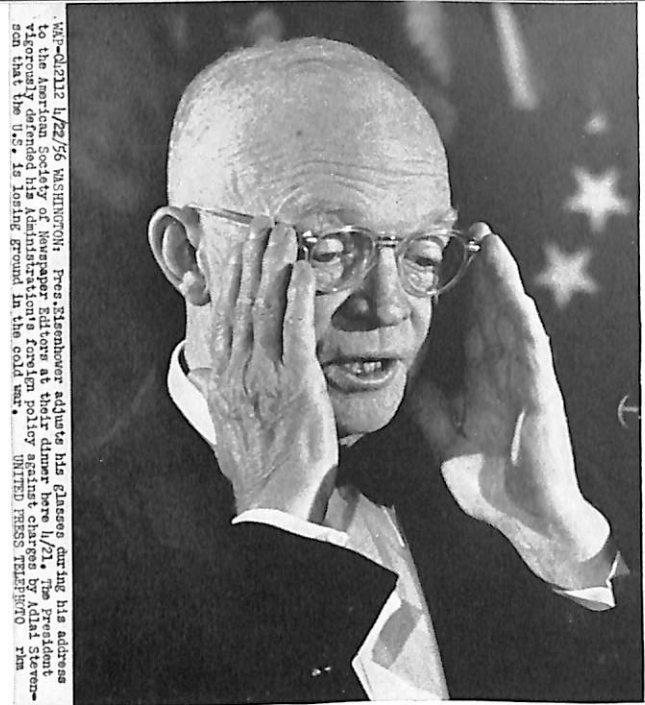
#### **tips from newsmen**

After answering hundreds of questions about 35mm for news photographers, I am beginning to learn new angles from some of the former questioners. It's a satisfying experience. Harry Van Tuyl of the Janesville (Wisc.) Gazette told me of another type of newspaper photography: fashions for that very important department—the women's page. He wrote:

"...I used nothing but the Leica with 90mm and 50mm lenses. Milt, it was a revelation. For the first time the models got through their poses without being light-blinded and without getting worn out waiting for me to correct my focus, put in film, and shoot.

"I took some 200 shots in the studio, giving the fashion editor the widest variety she ever got, and I feel that they are the best I have done in 10 years."

I get many such letters—about specially-adapted pistol grips; handy-dandy belts from which dangle lens pouches (from someone who didn't want to carry



NEWS PICTURE of President Eisenhower taken with 400mm Telyt by Milt Freier. Photo appears with caption pasted on for transmission by United Press Telephoto network.

a camera bag); and testimonials such as the one from Horace Tucker in Houston who made airviews of an explosion-disaster which was played eight columns across the front page—beating the opposition, too. Another letter I prize was from Sam Vestal of the Watsonville (Calif.) Register Pajaronian. He sent me tear sheets which, when shown to a non-believer, prompted suggestions that the quality of reproduction from 35mm efforts was good only because the newspaper probably used a flat-bed press. I queried Sam on this one. He wrote back and said the press happened to be a rotary. In any case, I took it all as a compliment for 35mm photos, because there are no tremendous differences between the two types of presses. The Register Pajaronian's pictures were good because an unbroken chain of pride-of-craftsmanship stretched from the camera designer's quiet office to the newspaper's noisy pressroom. I am in the fortunate position of seeing both ends of the "chain."

Of the incident above, Sam Vestal said, "Our pressmen were mighty pleased to hear about someone's approval of our reproductions. They are a unique bunch and take an unusual pride in their work."

I have seen this pride-of-craftsmanship at work in the Leitz offices, too. For example, I once heard one of our people mildly scolding a Leica-owner for grossly abusing his equipment when he saw the man open a camera bag with gadgets piled all over the camera. At first, I thought this was the wrong way to treat a customer. But I noticed, later, our man and the customer were enjoying complete rapport. Mr. Customer felt new pride in his Leica because someone here "cared."

Pride-of-craftsmanship has always been characteristic of both news photographers and the men who make precision 35mm cameras. Together, they're revolutionizing news pictures!

ONE-MINUTE development of 35mm negative in paper developer produced this photo by author. (See text.)



# the microscope as Leica lens / Dr. J. Grehn

microscope and camera form team for exciting pictures

(Reprinted from "Leica Fotografie")

Even a casual photographer learns many principles of optics and even an amateur microscopist becomes familiar with the structure of his research instrument. The idea of joining camera and microscope to take photos of magnifications is certainly an exciting one, and entirely within the scope of either the exploring amateur or the professional researcher such as the hospital pathologist, who vitally needs it. Photomicrography is in easy reach of the Leica owner who uses a microscope. All that is needed is an accessory to join the two instruments and an introduction to the nature of the union.

The optical function of camera and microscope are closely related. They both exist to form images, though the images they form differ widely in their orders of magnification or reduction.

But in close-up photography the camera is on its way to being used like the magnifying glass of the botanist. In both cases, the object is to show an arrangement, a texture or a relationship more clearly than it could be seen with the unaided eye. The step from the magnifying glass to the microscope is not

a big one, and we need only glance at a schematic diagram to see how basically similar optical relationships are apparent in the different sizes of the images formed. (See Fig. 1)

Being a schematic diagram it is not, of course, to scale, but it does illustrate the salient points:

(1) This illustrates the most usual way in which a lens is used in normal photography (landscape, architecture, news).

(2) Here the subject is much nearer the lens. The lens must be focused for this distance by rotating its helical focusing mount or by using accessories (close subjects).

(3) The distance of the subject from the lens is less than the lens extension from the film plane, the lens having been racked out on a bellows (macro-photography).

(4) The distance from subject to lens is extremely small. The intermediate aerial image formed by the lens is treated as another subject which is further magnified by an eyepiece. This two-step magnification is the primary function of the microscope (photomicrography).

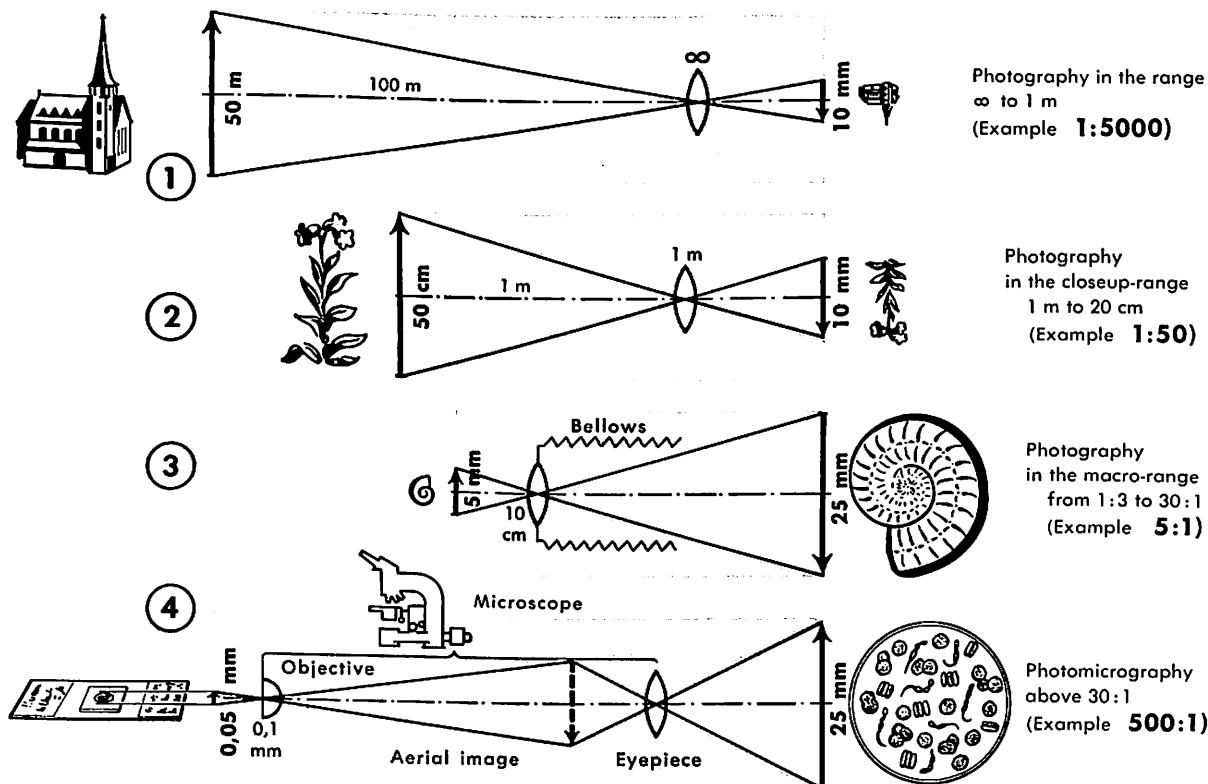


Fig. 1. Diagrams of image/object ratios of reduction and magnification.

### microscope operation

Basically, the microscope regarded as a photographic objective, or lens, differs from normal photographic lenses in that it magnifies in two stages, though this, of course, gives rise to important considerations which govern the technicalities of uniting microscope and camera.

Let's deal with the microscope first: just as the performance of a photographic lens depends primarily on the precision with which it is made, so the performance of a microscope depends primarily on the quality of the microscope objective. Although the intermediate aerial image cast by this lens is not caught on a screen, it is still a real image which can be made visible. Moreover, this image contains all the detail "resolved" by the microscope. We want to emphasize that the objective is optically the most sensitive part of the microscope. A great deal of ability and craftsmanship have gone into its production. The correct use of such an objective calls for some technical knowledge.

The eyepiece (microscope ocular) is responsible for the second step in magnification; its relationship to the intermediate aerial image can be compared to the function of an ordinary camera lens. And, like a camera lens, it does not make new details visible in a subject. It merely increases the size of subject detail already resolved by the microscope objective to dimensions larger than those of the grain size of film emulsions, and also larger than the pigment cells of the retina of the human eye. The eyepiece greatly influences the end quality of the image.

Objective and eyepiece together form the magnifying parts of the microscope, which we may suppose is in front of the camera. The high magnification obtainable with a microscope requires that it be used with an intense light source so that the image shall be sufficiently bright. This is possible only when compact high-intensity light sources are used together with condensers.

### uniting microscope and camera

The high optical and mechanical accuracy in instruments of this caliber requires an equally precise union between microscope and Leica for photomicrography. This is best brought about by using carefully constructed Micro Accessories:

The first of these is the Micro Ibso, available for both screw-mount and bayonet-mount Leicas. It is locked into the Leica lens flange in place of the normal lens. It also accepts the microscope eyepiece on a threaded ring, and so it can be inserted into the microscope tube with Leica attached. (Fig. 2) In addition to the microscope eyepiece (which can be

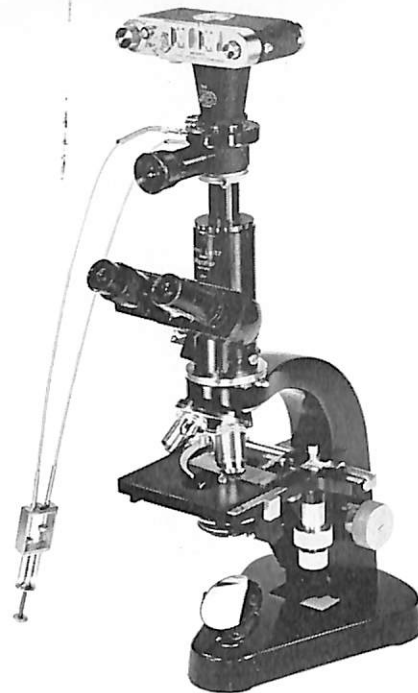


Fig. 2. Micro Ibso, Ig Leica and Labolux microscope.

interchanged with others of higher or lower power), the Micro Ibso also has a lateral telescopic eyepiece through which the definition and limits of the image can be controlled by eye. This image is seen via a half-silvered prism which deflects part of the image-forming rays into the telescopic eyepiece. The prism is on a swivel, and can be swung out of the path of these rays for the exposure. This permits you to see the image of a moving object under the microscope right up to the instant of exposure, and if desired, during the exposure itself. The Micro Ibso has its own blade shutter and it should be used instead of the Leica shutter. A one-third reduction of the image on the Leica format is achieved by means of a field lens in combination with the so-called one-third conical extension which forms the upper part of the Micro Ibso. The image on the film is reduced to one-third the microscope magnification. Thus, a three-diameter enlargement corresponds with actual microscope magnification.

This arrangement of microscope-Micro Ibso-Leica is a most favorable setup for recording observations made through a microscope. The microscopist now uses photography instead of a notebook.

For difficult cases the camera is united with the microscope on a kind of optical bench in which the rails are vertical. This keeps the camera apparatus attached to them on an imaginary line which is a continuation of the optical axis of the microscope. The "Aristophot" stand for photomicrography can be used with any microscope, or the camera can be attached to the integral stand provided on microscopes like the "Panphot" which are specially designed for photomicrography. In both cases the Leica could be used with the Micro Ibso micro-adapter, but instead of this adapter a special micro-reflex-housing with provision for ground-glass observation might be found pref-



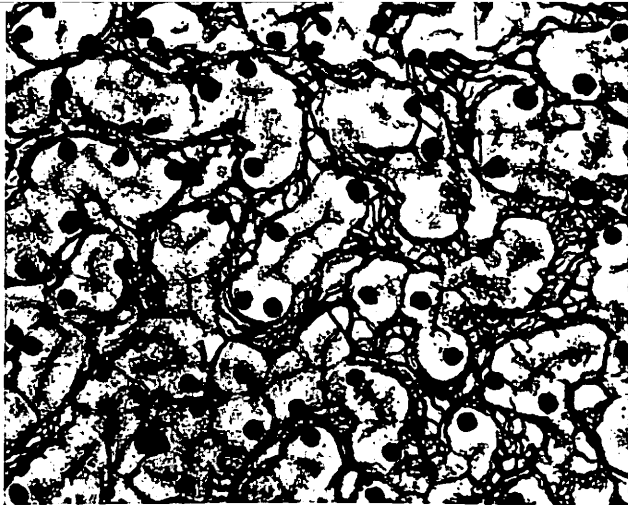


Fig. 3. Gall capillaries in a liver section, about 400X.

erable. In both cases, too, bellows extension can be fitted in front of the micro-reflex-housing to permit photography in the macro-range, that is, magnifications on the film using the objective alone (without eyepiece). Both these arrangements can also be used with reflex plate cameras.

#### the basic technique of photomicrography

Here we can discuss only a few principles drawn from a photomicrograph. They cannot have the value of detailed instructions because that would require an extensive introduction to microscopy itself, the preparation of specimens, and the modifications of photographic technique.

Figure 3 shows gall capillaries in a liver section. The microscope specimen—i.e., the subject of the picture—is so thin (it has been sliced, or prepared by other methods) that it is translucent. The various parts of its structure, composed of many different organic substances, absorb light in different degrees, so that what we see through the microscope can best be compared to the image of a shadow in which there are many delicate and finely graded steps. In photomicrography, the need to render the delicate outlines of the structure as sharply as possible by transillumination, indicates the use of filters which pass light of certain definite wave lengths. This is because the many wave lengths of visible light (the colors which make up the spectrum) have somewhat different indices of refraction. Hence the images formed by them will not always coincide exactly (this is not usually observable by the naked eye, but it becomes apparent in the photomicrograph). Yellow-green filters are generally used because most microscope objectives have optimum correction for light of this color.

As mentioned above, the resolving power of a microscope (i.e., its ability to separate very fine detail in the specimen) depends in the first place on the microscope objective. The eyepiece magnifies this resolved detail to a size at which it can be seen by the eye. Here the size of the light-sensitive cells of the human eye requires that the detail to be observed must itself be of a certain minimum size in order to be seen at all. So, the choice of a suitable eyepiece

is almost as important as the choice of microscope objective. The resolving power of the photographic emulsion—i.e., its ability to separate fine details packed close together—is generally somewhat higher than the resolving power of the human eye. Hence in photomicrography it will be found that eyepieces of lower magnification than those needed for visual observation will often be quite adequate. *In the interests of image quality it is always advisable to take advantage of this fact.* A good working rule for photomicrography is: use a high-power objective and a low-power eyepiece to obtain a magnification which completely fills the frame.

#### film and development

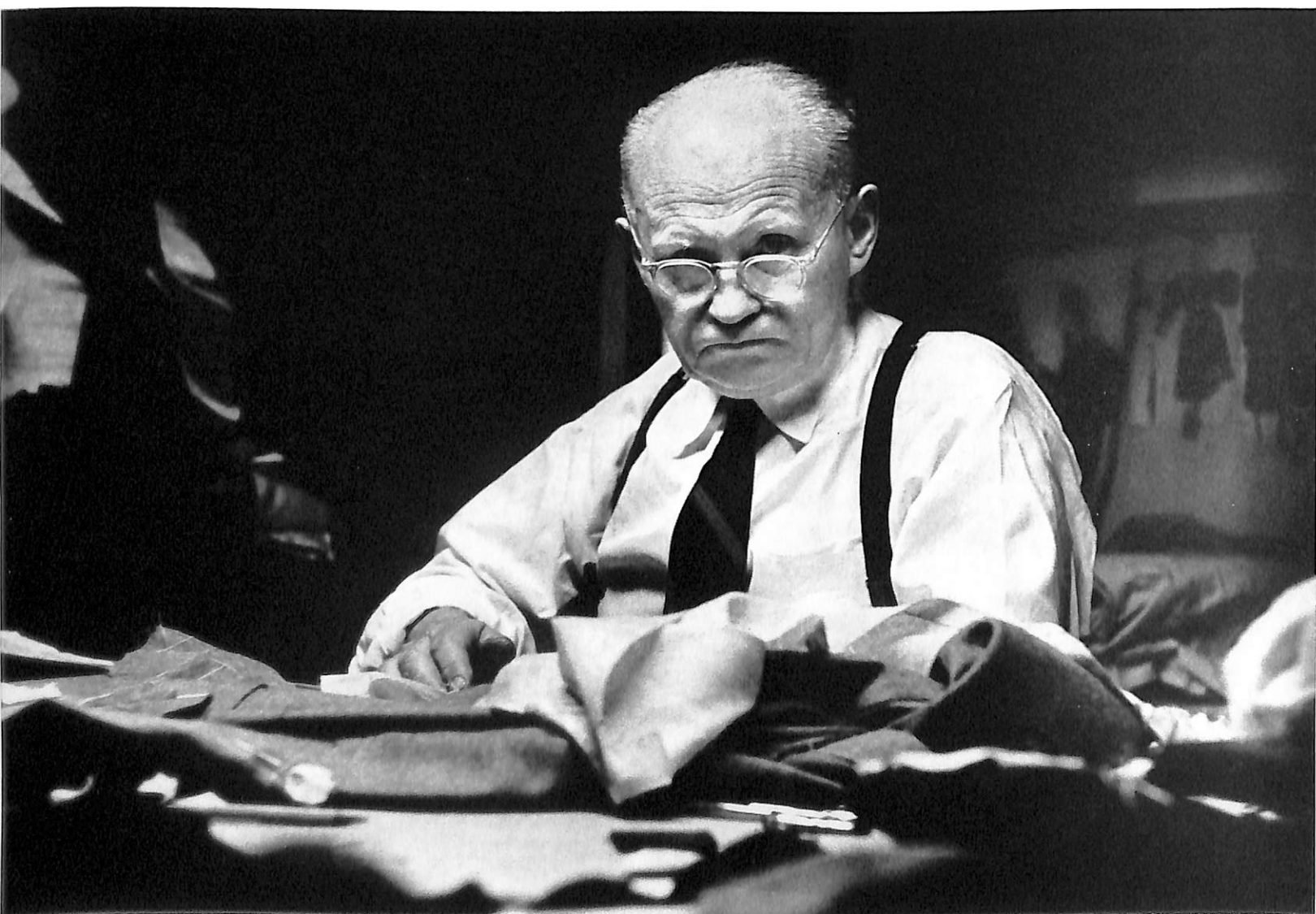
In photomicrography most specimens are static—they do not move. Artificial light sources are generally available. So the conditions are ideal for the use of slow, very fine-grained film which will record fine detail. And it should be developed in a manner which preserves its fine grain and gives the image delicate gradation. Films rated at 10/10 to 15/10 DIN or about 8 to 16 ASA are very suitable for the purpose. Panchromatic film should be used for specimens which exhibit color, and orthochromatic film where there is no color. Where specimens exhibit very little contrast, high contrast document copying films are useful. The processing particularly recommended is the one-time method based on the use of p-aminophenol/caustic developers, such as Rodinal, Perinal and X-22. To preserve excellent gradation in the negatives these developers should be used at the dilutions recommended by manufacturers.

In this short article we have been able only to highlight photomicrographic problems and techniques. Also, we can only mention, without detailing, a few of the various aids available to extend the possibilities of photomicrography. Thus, for living specimens which require very short exposures, special flash apparatus is available; and there are special exposure meters for accurate determination of photomicrographic exposures. Color photomicrography is on the increase, and it is interesting to note that the characteristics of the various brands of color film can be exploited to suit the particular conditions of optics or illumination. Finally, there are the special applications of dark-field, phase-contrast, polarized and fluorescence microscopy. But these cover so wide a field of photographic and microscopic experience that it is wisest to tackle the subject of photomicrography a step at a time. This introduction to photomicrography should be an aid to the newcomer as he experiences his first adventures in combining camera and microscope.

## Leica portfolio

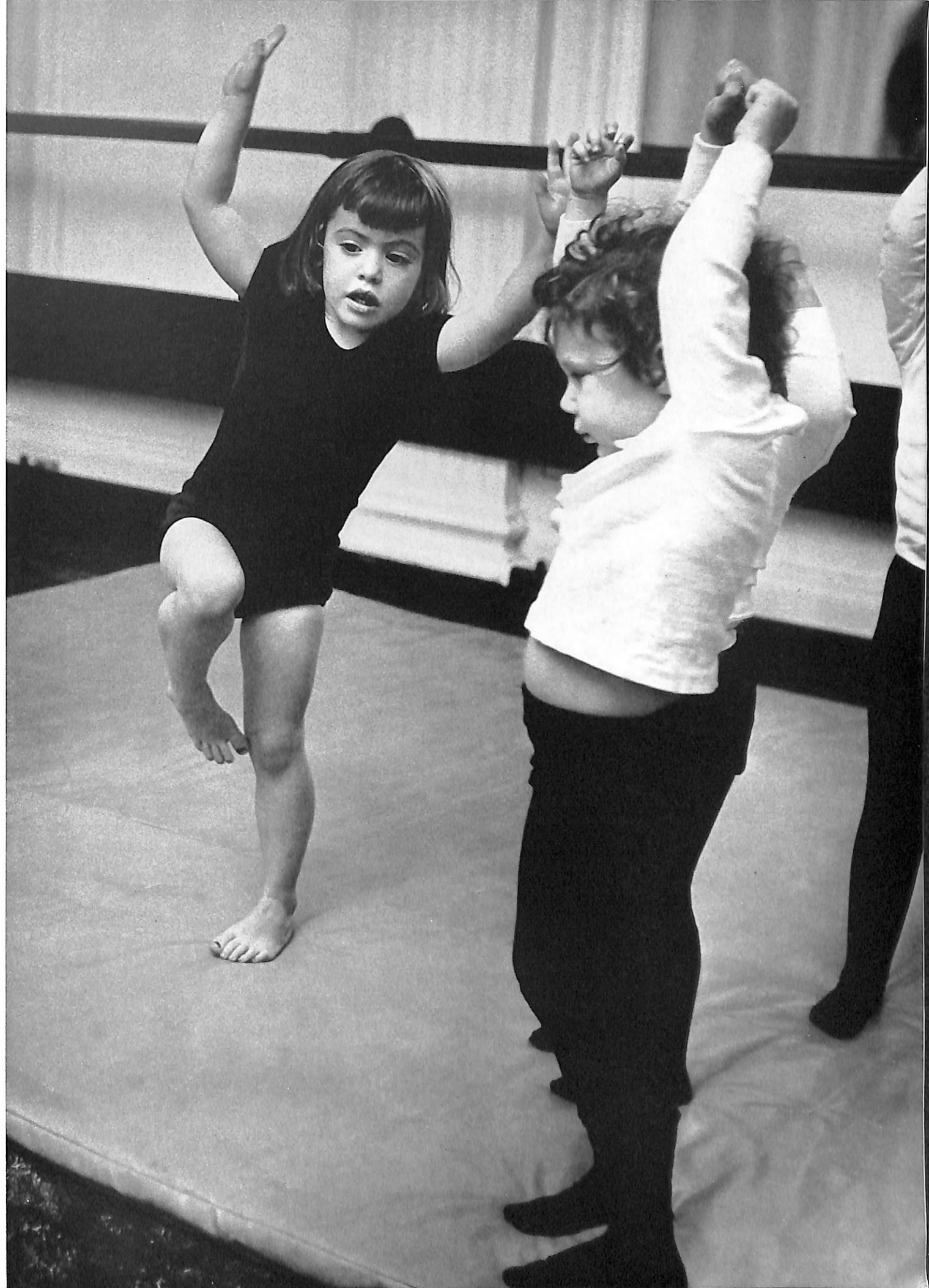
*Presenting four examples of the many outstanding contributions made to photography by Leica owners in all parts of the world.*

**Claude Beaumont.** Portrait of his father. IIIIf, 50mm Summitar.





**Esther Bubley.** Gym class. M-3, 50mm Summicron.





**Ken Heyman.** Football. M-3, 200mm Telyt.



**Esther Bubley.** Ship painters. IITf, 50mm Summarit.



## photography cold and hot

the camera exposed to extreme temperatures

*The two letters printed here arrived a couple of weeks apart. Considerably further apart, however, were the photographers who wrote them. Robert Christopher, a free-lance photographer and author ("Ocean of Fire") told us of his adventures on a recent trip to fabled Timbuktu, where cameras sometimes got too hot to handle. John Guerrero, on the other hand, gave us a chilling account of his camera work at the South Pole where temperatures slid to 100° F. below zero. Next time you're grouching cheerfully about the small hazards involved in normal hot- or cold-weather photography, give a thought to these letters!—Ed.*

### Letter from the South Pole

Geographical South Pole, Antarctica  
Gentlemen:

I was a member of the scientific staff of the International Geophysical Year stationed at the Geographical South Pole during 1957. I was asked by the National Geographic Society to assist in photographing the Pole during its first year of occupation. And, since photographers' working conditions at the Pole are unique, I thought you might be interested in my experiences.

At first, during the summer, it was fairly simple to take pictures at -30° F. But, when winter came and temperatures plunged more than 100° F. below zero, photography became a nightmare. Fingers and cameras would freeze, viewfinders would frost over, and film would get cold and break. You will be happy to

**Antarctica**—IGY workers in South Pole snow trench. Winter chill drops to -100° F. at the Pole.



hear that the M-3 kept functioning after all other cameras froze up.

We had to bracket every exposure because we had no idea how much the film speed was reduced as the emulsion got colder. Incidentally, I found I could operate the shutter speed dial on the M-3 without taking off my mittens. That is because I merely had to rotate it to change shutter speeds rather than use any of the methods necessary with other types of cameras. And the extra-large viewfinder was a godsend. It was possible to take pictures when smaller viewfinders were completely frozen over. The bright images of the coupled rangefinder showed through a partially frosted viewfinder without difficulty. Another feature of the M-3 which proved a boon to cold weather operation was the two-stroke film advance. I was never troubled with film breakage or static electricity, both of which bothered some of the other photographers.

Necessity forced us to develop new methods of carrying our cameras outdoors to delay their freezing as long as possible. We usually carried our cameras inside our parkas, where body heat would keep them warm. I was able to take my camera out of my parka and shoot up an entire thirty-six exposure roll of film at -100° F. Yet I noticed with somewhat ungenerous satisfaction that other supposedly top-bracket cameras were good for several pictures and then gave up completely. I carried a 90mm, f/4 Elmar lens in my pocket, and with a little practice was able to change lenses with my mittens on.

After a roll of film was shot outdoors, both camera and photographer were brought inside for thawing. The camera was generally wrapped in a blanket or a parka and allowed to sit for several hours. The blanket would allow the camera to warm slowly and prevent frost from forming on it. Sometimes, as during air operations, the camera had to be used as much as possible. So, it was brought inside and given a quick thaw over the stove. Frost would form over the camera an inch thick before it would start melting off. As soon as the camera was dry, it was reloaded and taken back outdoors.

I was most happy with the way the M-3 performed for me during that chilly assignment. It's as if you had designed it especially for Antarctic use.

*John F. Guerrero*





**Africa**—Salt pit workers in the Sahara. Temperatures in the area often reach 165°F at sand level.

#### Letter from the Sahara

Timbuktu, French West Africa  
Gentlemen:

If there is an "end of the earth"—this is it! Though it lacks most of the comforts of life I must admit that I'm darned happy to be here. Now that I've finally realized my lifetime dream of going to Timbuktu, I need a while to rest up from the fantastically miserable journey crossing "La terre de soif et mort" (Land of thirst and death) that is an area of the Sahara that is a real hell on earth, and I'm trying my best to forget it. It was there that our little four-man (seven camels) caravan ran out of water, and we had to kill a camel and drink its blood for three days!

A few weeks back, I had the good luck to meet up with a crew of French military airmen at one of the oases; they promised to mail a bunch of my film back to my publishers when they landed back in Oran. A cablegram waiting here for me said that the magazine had received them and that every roll (both color and black-and-white) was perfect. That may not sound surprising to you, but I wonder if you have ever done any shooting under the crazy conditions that we have out here on the world's greatest desert. At night, the temperature drops to below freezing; during the day, it hits an unbelievable 165°F out on the sand. But the only trouble I've had with the

camera is that it literally got too *hot* to handle. I kept my film insulated from the heat in a box made of inch-thick cork. I wasn't sure that it was going to work but obviously it did. If there is any place hotter than this desert, I have no intention of going there! So, I guess I'll never have to worry about my Leica insofar as weather is concerned.

Now that I know the film is okay I can laugh about the time my camel sat on my camera. Camels, as you've probably heard, are the most miserable critters in the world. When they take it into their heads to do something—they do it! I was out riding when suddenly my unreasonable beast decided to lie down. I had time only to jump clear so that he wouldn't roll over on me. One of my Leicas was tied to the saddle, and when I looked around, I saw 1400 pounds of camel lying right on top of it. When I finally got the camera out of the sand, I was sure that it was done in. I had a little trouble getting it open, and the lens mount looked a little awry. But it still seemed to work. And, as I said before, the pictures were all good. So I'm happy to report that the Leica is strong enough for a camel to sit on. I don't recommend going to the desert, but one thing that is great here is the light. For Kodachrome, I've been using 1/200 at f/8! The picture editor is happy, and to satisfy those boys you have to give them the right exposures.

I *have* had some trouble with the Leica lens, but not a kind that's likely to bother many people. The desert people are Mohammedans who believe in the "evil eye" and try to avoid it. A *lens*, to many of them, is just that—an "evil eye." Fortunately, I have been able to explain the camera's function to most of the Tuareg tribes I have lived with, and there has been a minimum of trouble. As a matter of fact, I was surprised at how well these simple tribesmen learned to work a Leica. One of the men with whom I traveled took several shots of me and got good pictures.

The sun has climbed and the shade I have been writing in has disappeared, so I'll sign off for now and get back to work. My two Leicas and I have a date to cover the arrival of a salt caravan that is expected in from Toadeni.

Best wishes from West Africa,

*Bob Christopher*

# building better roads with photography

J. H. Havens

## photomicrography finds answers for highway engineers

Photography assists in building highways! Does this sound a bit far-fetched? When we go even further and say: "The miniature camera and photomicrography help to build modern highways," the average photographer will probably think that we are indeed stretching our point too far. But, such is not the case.

Highways, bridges, drainage facilities, and traffic-control devices are all fixtures of the landscape. If one is to study them to diagnose their shortcomings and to devise improvements, he must do it in the field where operational conditions exist. Specimens and samples may be brought to the laboratory for detailed study, but, even then, it is important to know all of the physical conditions which surrounded the sample in its original location. Photographs are the answer to this need.

Since the engineers and technicians who perform this field work are not primarily photographers, they need compact, efficient, and reliable photographic equipment. And yet, their finished pictures must be of such quality as to make enlargement and close study reasonable, and reproduction in reports possible if need be. Hundreds of pictures may be made on a field trip, any one of which may later be needed for publication. Conditions often cannot be duplicated, even if a trip back to the location should be practical. So, the first pictures have to be relied upon although at the time that they were made, reproduction was not considered. This rigorous set of conditions clearly calls for precision miniature cameras. Thus, 35mm cameras are used extensively in the field. But, when field work on a project is completed, the camera is not shelved by any means. As a matter of fact, it has only begun to work. And it is this latter phase of photography in highway research that we shall describe in this article.

### exploring surface failure

In one investigation the problem was that concrete pavements made with stone from one particular quarry exhibited marked early surface failures, while those made with geologically similar stones from other quarries in the same locality held up well. A geological crew spent several days in obtaining samples

at one-foot vertical intervals up the face of the quarry—almost one hundred feet high. These were taken to the laboratory where physical and chemical tests revealed that a seam of substandard material about one foot thick near the center of the quarry was the cause of the failures. An intensive study was launched on this one stratum so that it could be identified in other quarries before it was used in future road surfaces. Identification techniques were devised partially on the basis of microscopic examination of thin sections of the stone ground thin enough to transmit light—a tedious and time-consuming task. Then, other important sources of stone used by the highway department were sampled at one-foot intervals. Thin sections were prepared, and photomicrographs made with a Leica and Micro Ibsco for comparison and record purposes. (*See Fig. 2, p. 16*) In total, more than 1200 photomicrographs were made and the prints are filed in an office card file for ready reference when questions arise as to the type of formation found at some level in a quarry, or when a new unknown specimen needs to be classified.

Later this technique was extended into a study of sandstones for experimental use as mineral aggregates in highway construction. Another photographic technique was used here to determine the relative percentages of granular material and cementing material in the sandstone specimens. (*See Fig. 1*) Since the sand grains could be rendered opaque or bright with polarized light on the thin sections, and the cementing material holding the grains together could be thus differentiated, contrasty prints made from the photomicrographs eliminated the midtones leaving either black grains and white cement areas or vice versa—a silhouette effect. A homemade light box and photocell were contrived to measure the integrated light transmission of prints of this type. By expressing the total light transmission as a percentage of the light which was transmitted by a sheet of the same printing paper which had been fixed-out with no image on it, a good estimate of the cement-to-grain ratio was made quickly from a number of photomicrographs. (The instrument was "zeroed" with a sheet of completely blackened paper.)

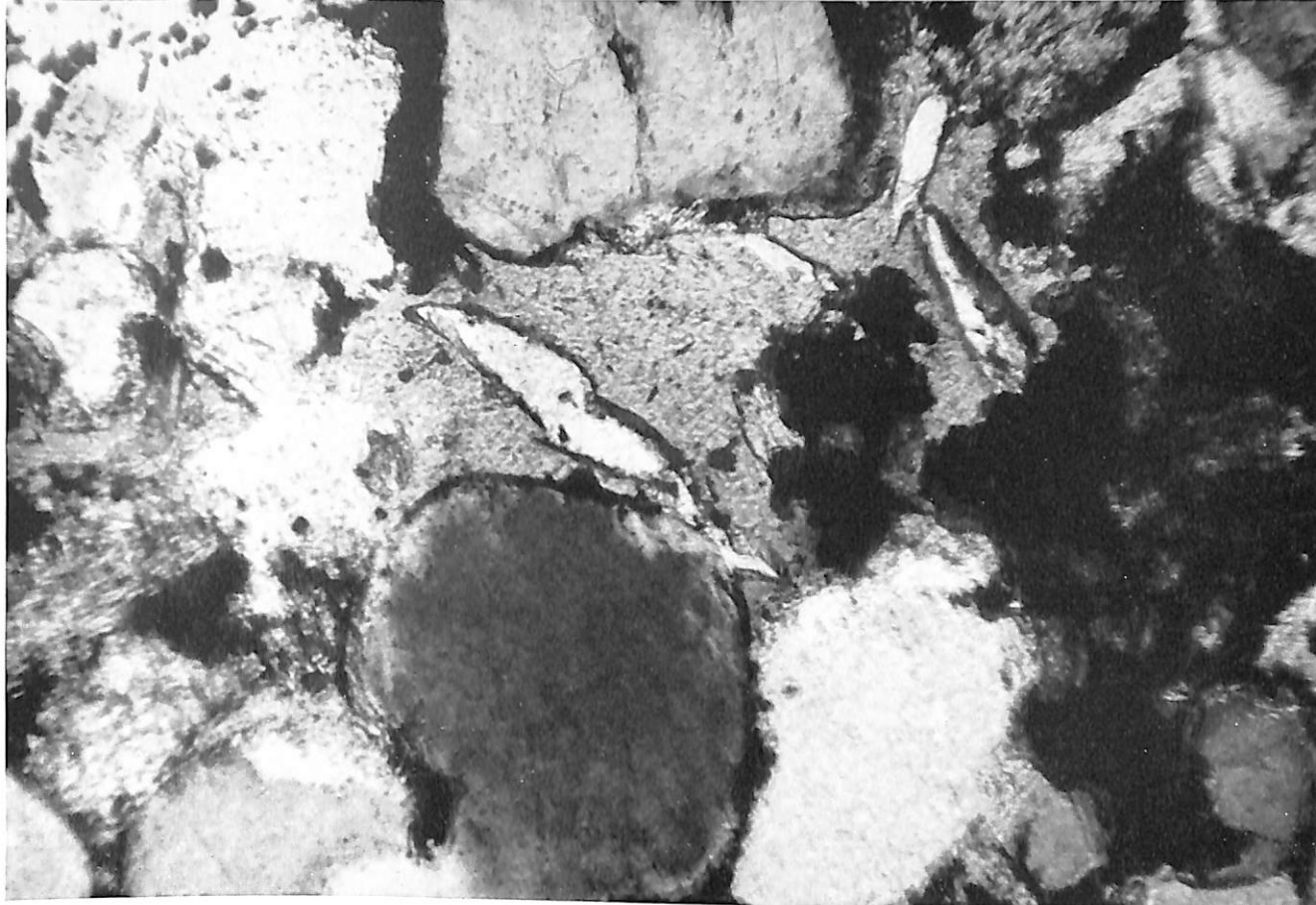


Fig. 1. SANDSTONE PHOTOMICROGRAPH shows thin section of sandstone with typical sand granules surrounded by cementing material.

#### other spheres of interest

In another investigation which concerned the use of minute grain-size glass beads as reflecting agents, the camera was used as a basic laboratory tool. When ample supplies of these beads became available after the end of World War II, there was a rush to apply them to highway markings to increase their visibility under automobile headlights. There was, however, no clearly defined fundamental information available on the principles on which these tiny reflector elements operated, or on methods of application for maximum effectiveness and life expectancy.

The beads were too small (average diameter of 0.12mm to 0.06mm) to be studied except by microscope. Record, discussion, and publication needs again brought the Leica into play. Various traffic stripe surfaces using different bead and paint application and mixture techniques were photographed at intervals throughout an artificial weathering program. Failures were recorded photographically and reasons for them determined. This program culminated in a series of specifications under which reflectorized paints and other materials could be used. The photomicrographs serve as continuing reference standards for comparison with current products as they are purchased and used. (See Figs. 2 and 3)

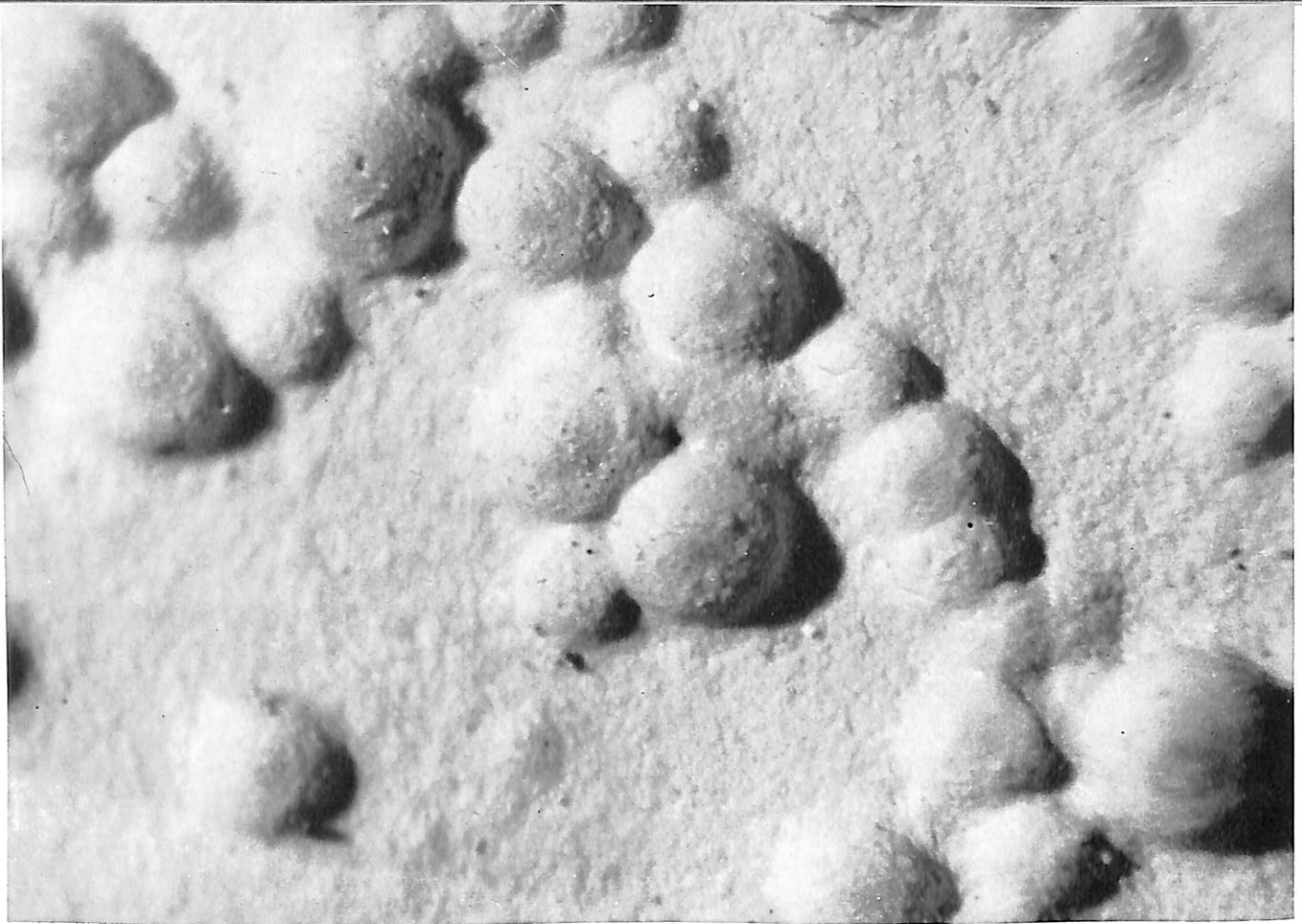
#### optical functions analyzed

As another phase of this same project a theoretical

physical analysis was made of the optical function of a complete glass sphere as an optical system—combination lens and spherical reflector. The Leica was used to check the accuracy of the mathematically determined performance. A single glass bead somewhat larger than those used in service, but of the same refractive index, was mounted on a slender glass rod in a large black velvet-lined box. Aimed at the glass bead was a sharply defined, collimated beam of light incident from one side. The camera view of the bead was at a right angle to the light beam through a glass window on the front of the box. The box was filled with smoke to make the light beam visible and to enable visualization of the rays after they had gone through the glass sphere. (See Fig. 4) Other pictures were made with a reflector surface placed at the focal point of the system to ascertain the effect of the bead on light directed back through it, and with a reflector in contact with the rear surface of the bead (ahead of the focal point) as is the case when a bead is partially submerged in a paint film.

These photographs were made with a 50mm lens and 45mm and 60mm extension tubes with a Focoslides. The photographs were taken on Kodachrome Film, Type A. The diaphragm was closed to an indicated f/16 (effective f/48 due to the extended position of the lens) to achieve maximum depth of field since the laboratory setup was rigid enough to permit a

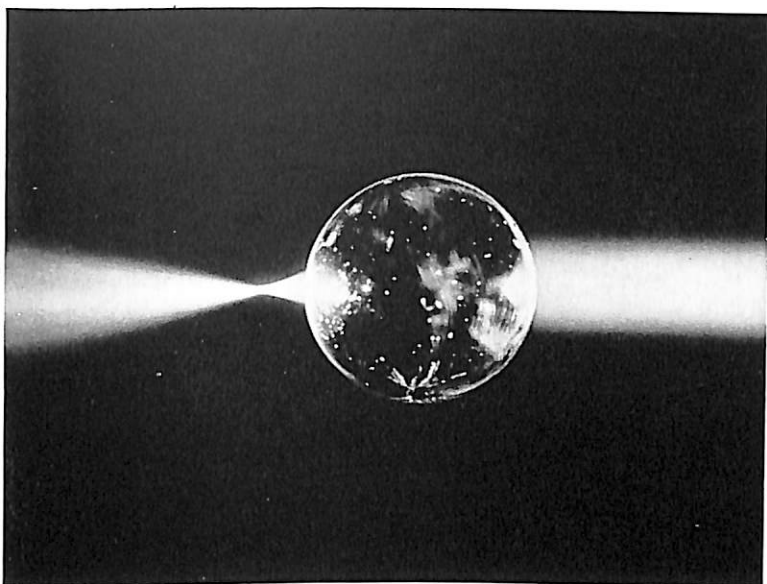




*Fig. 2. PRE-MIX TECHNIQUE.* Photomicrograph shows glass beads mixed with paint prior to application as highway center-stripe. Result is a surface in which a thin film of paint remains over the tops of the beads after drying. This must be polished off by traffic before the beads are effective.

*Fig. 3. DROP TECHNIQUE.* This reflectorized paint photomicrograph shows glass beads dropped onto wet paint after application as center-stripe. Note that no paint film obscures the tops of the beads here, and initial brilliance is quite high.





*Fig. 4. BEAD PHOTOGRAPH.* Monochrome copy of Kodachrome transparency showing the optical function of a glass sphere as an optical system. Made with a Leica IIIc and extension tubes as described in the article.

long exposure (in this case two minutes). Indeed the long exposure time was desirable since it allowed the swirling smoke particles to define the light rays without individual curls of smoke being recorded on the transparency. Another larger camera was used to make black-and-white negatives for eventual publication use to save the time involved in making copy negatives from the Kodachromes.

When the finished transparencies were projected on a screen, the position of the focal point and the external path of the light rays were readily measurable with respect to the glass bead. The validity of the theoretical work was clearly demonstrated and verified, forming a basis for a clearer understanding of re-reflectorization.

The brilliance of these new-type highway markings and centerline stripes has led many people to refer to them mistakenly as "luminous, fluorescent, or phosphorescent." But they are not. The lines are brilliant because of the glass bead additions which form reflex-reflectors and return most of the incident light back in the direction of the source regardless of the angle of incidence. Specular surfaces (e.g., glossy painted surfaces) obey the mirror-reflection laws and direct their reflections away from the source at an angle with the normal, equal to the angle made by the incident rays, but on the opposite side of the normal. Diffuse reflectors reflect light nearly equally in all directions in front of the reflecting surface and

hence considerably dilute the light in any one direction. Photography made possible a better understanding of the optical principles of reflex-reflectors and contributed greatly to their effective application to highway safety.

Photography is used in other phases of highway research too numerous to describe in detail here. A study of lamps used in traffic lights (where long life and dependability are a "must") involved infrared photographs of the glowing filaments. (See *Fig. 5*) Studies of asphalts used in pavements were aided by photomicrographs of the asphalts themselves, and photomacrographs of the mixtures. Culvert corrosion in the field is surveyed and documented by camera records. A carefully planned program of photographs is a basic requirement for almost any field test installation whether it is the planting of roadside slopes to prevent erosion, or the pouring of experimental pavement joint-sealing compounds. No matter which state of the union you may be in, when you see one of that state's highway department research crews on the road, there is usually a camera in their kit of instruments. And quite often this will turn out to be a Leica.

*Fig. 5. TRAFFIC LIGHT in the lab.* Leica IIIc with extension tubes photographed the filament heat pattern using infrared film.



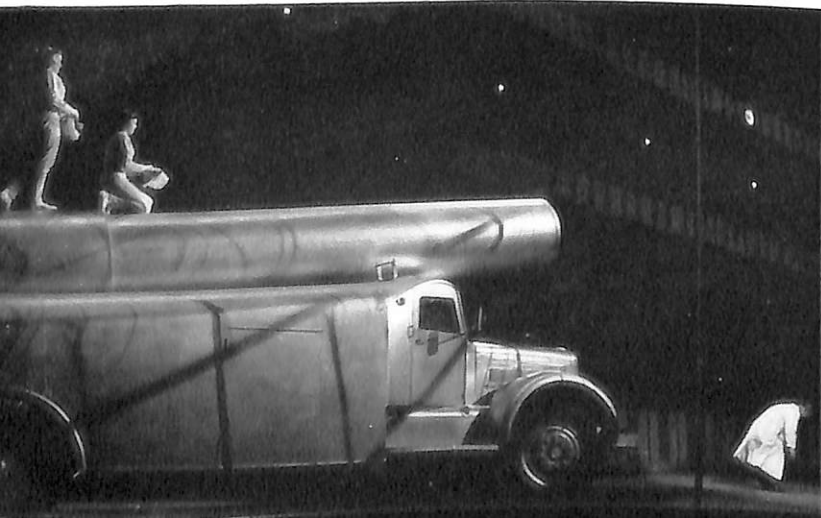
## darkroom under the big top / *Murray Zinn*

a showman builds a unique one



"BULLET'S" TRAJECTORY ends 200 feet from cannon in safety net.

AUDIENCE is unaware of darkroom behind door in cannon's base.



The "human cannonball" act of the Zacchinis has the essential simplicity of most gripping events. Edmondo Zacchini introduces the act, his two young daughters, dressed in white leather suits, climb into a giant cannon mounted on a truck — then, a loud "boom!" and one of the girls is shot into the air. Before she lands in a net 200 feet away, another "boom!" and her sister also is flying through the air.

Many in the audience have wondered how it's done. Edmondo Zacchini, inventor of the act in 1922, isn't telling. But as an avid photographer for some 45 years, he finally is telling where his darkroom is.

During much of his spare time, Zacchini can be found shooting pictures with his Leica M-3 about the circus arena or "backstage." Inevitably, he is known as "Cecil B." to fellow performers, who willingly pose for him. But then someone observes, "That picture he took the last night in Boston, he had prints two nights later in New York. He must have his own darkroom. Where is it?"

In good sleight-of-hand tradition, Zacchini keeps his darkroom right in front of us, but we don't see it. Where is it? Where else but inside the base of the cannon itself.

In a space which might discourage hobbyists with more height and less enthusiasm, Zacchini has installed a complete darkroom measuring 4' x 4' x 5'4". Located under the cannon barrel, it's always handy.

Along with a homemade enlarger (in which he no doubt uses a fairly short lens), the darkroom boasts custom-built shelves, cabinets and electrical outlets.

To use the darkroom, Zacchini hooks up his electric circuits to the nearest suitable current supply. He uses whatever water is available for processing and washing, first subjecting it to the Zacchini taste-test. If the water tastes salty or too full of minerals, he rejects it and instead uses distilled water which he carries for the purpose.

Crowded into his coat-closet of a darkroom, Edmondo Zacchini, who several times daily fires his own daughters through space to a target net without missing, produces hundreds of excellent prints of friends with the same accuracy.

For versatility with his Leica M-3, Zacchini uses the 35mm, 50mm, 90mm, 135mm and 200mm Leitz lenses. For black-and-white pictures, he uses fast films with manufacturer's rating doubled, and for





ENTIRE DARKROOM, including storage space, is only 4'x4'x5'4".

color, a variety of the films available. Zacchini is also an amateur movie fan with thousands of feet of circus action reels to his credit.

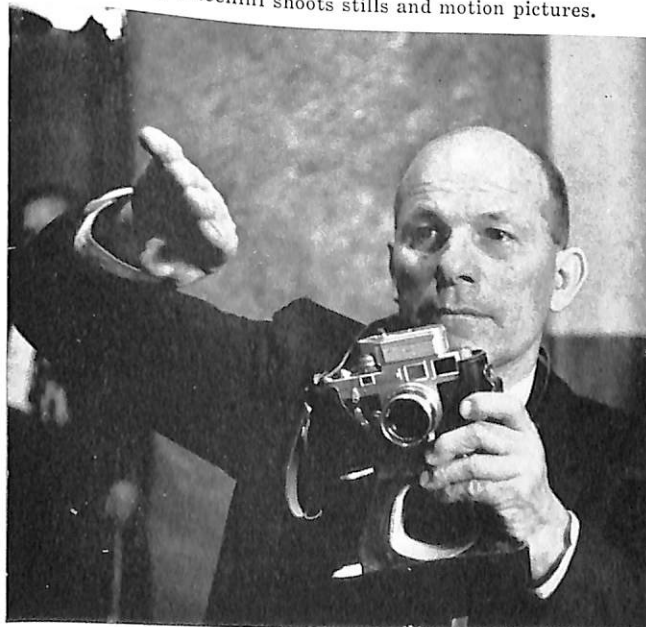
The Zacchinis, who are from Tampa, Florida, have been getting a big bang out of life for a long time, but it hasn't always been with the same cannon. The present gun is one of 14 which have been used over the years. All were designed and built by Edmondo himself, pioneer of ballistic entertainment. The enthusiastic Italian-American envisioned the act, designed the cannon, and became its first "bullet" in 1922. Several years and five leg-fractures later, he reluctantly transferred himself to "trigger" with brother Hugo as "bullet." The "trigger" is the Zacchini who points

the cannon and pushes the release button, shooting relatives in a 100-foot-high arc through space.

Despite the electrifying nature of the original one-bullet act, circus-owner John Ringling asked Edmondo in the early 1930's what could be done to liven it up! Edmondo's answer was to design the cannon which fires *two* of his relatives at a time. The first two-shot gun caused some injuries to the "bullets," but Edmondo feels he has eliminated all the "bugs."

The two-shot cannon seems to be enough excitement for all concerned now. Not for Zacchini. Does he enjoy photography as a hobby because it relaxes him? No—the reason he likes photography: "It is a wonderful *stimulant*."

BETWEEN ACTS, Zacchini shoots stills and motion pictures.



EDMONDO ZACCHINI'S Leica photo of fellow-performer Unus.



## focusing on...

**lens cleaning.** If you are tempted to use one of today's many treated lens-cleaning tissues or solutions on your coated camera lenses—don't! Leitz factory technicians say, "After testing (samples of treated materials) in our laboratory, we cannot recommend any of them for cleaning lenses." Many of the substances used to treat tissues leave traces of grease on lens surfaces; some materials produce small but definite scratches. Continued use of the latter could remove part of the lens coating.

The wisest approach to keeping lenses clean is to keep lens caps on both front and back of the lens when you're not using it. If dust does appear, try to remove it by brushing the lens surface *gently* with a "camel's-hair" brush. Use lens tissue only when brushing won't do the job—and use only *untreated* lens tissues.

**big news.** On our back cover, you will see news of a Leica so new that there was no time to describe it inside this issue. But by the time you read this, your dealer will have the M-2 in stock. So, don't wait for our description in our next issue; better stop in to see him soon for the details.

Late in September, Photokina, the famous European exposition, will open. There, the Leitz factory will show other new, exciting equipment for the Leica System of photography. Your dealer will have more details about these items too, as soon as they are released.

**collector's item.** One of the freshest ideas to hit photography since f/3.5 was a wide aperture is a new photography record. Called "Famous Photographers Tell How," it is a series of interviews with eight renowned photographers, an editor and the head of a famous processing laboratory. The photographers heard include: Weegee (news), Henri Cartier-Bresson (photojournalism), Arthur Rothstein (camera technique), John Rawlings (the nude), Tana Hoban (children), Philippe Halsman (portraiture), Bert Stern (advertising) and Peter Gowland (glamour). Bruce Downes of *Popular Photography* gives the editor's point of view on photography and Ralph Baum of Modernage Laboratories discusses darkroom techniques, including some professional printing tricks. The effect of the new recording is that of having these "name" photographers visit in your home for a chat. And what they have to say is as much "Tell Why" as "Tell How." Cartier-Bresson, for instance, says, in part, "Photography is in a way a mental process. We have to be clear on what we want to say—our conceptions, what we think of a certain situation and prob-

## FAMOUS PHOTOGRAPHERS TELL HOW:

WEEGEE, HENRI CARTIER-BRESSON  
ARTHUR ROTHSTEIN, JOHN RAWLINGS  
TANA HOBAN, PHILIPPE HALSMAN  
BERT STERN, PETER GOWLAND  
JACOB DESCHIN, critic — BRUCE DOWNES, editor  
RALPH BAUM, darkroom technique



lems." More attention to *why* we are taking a given picture will benefit our photography greatly.

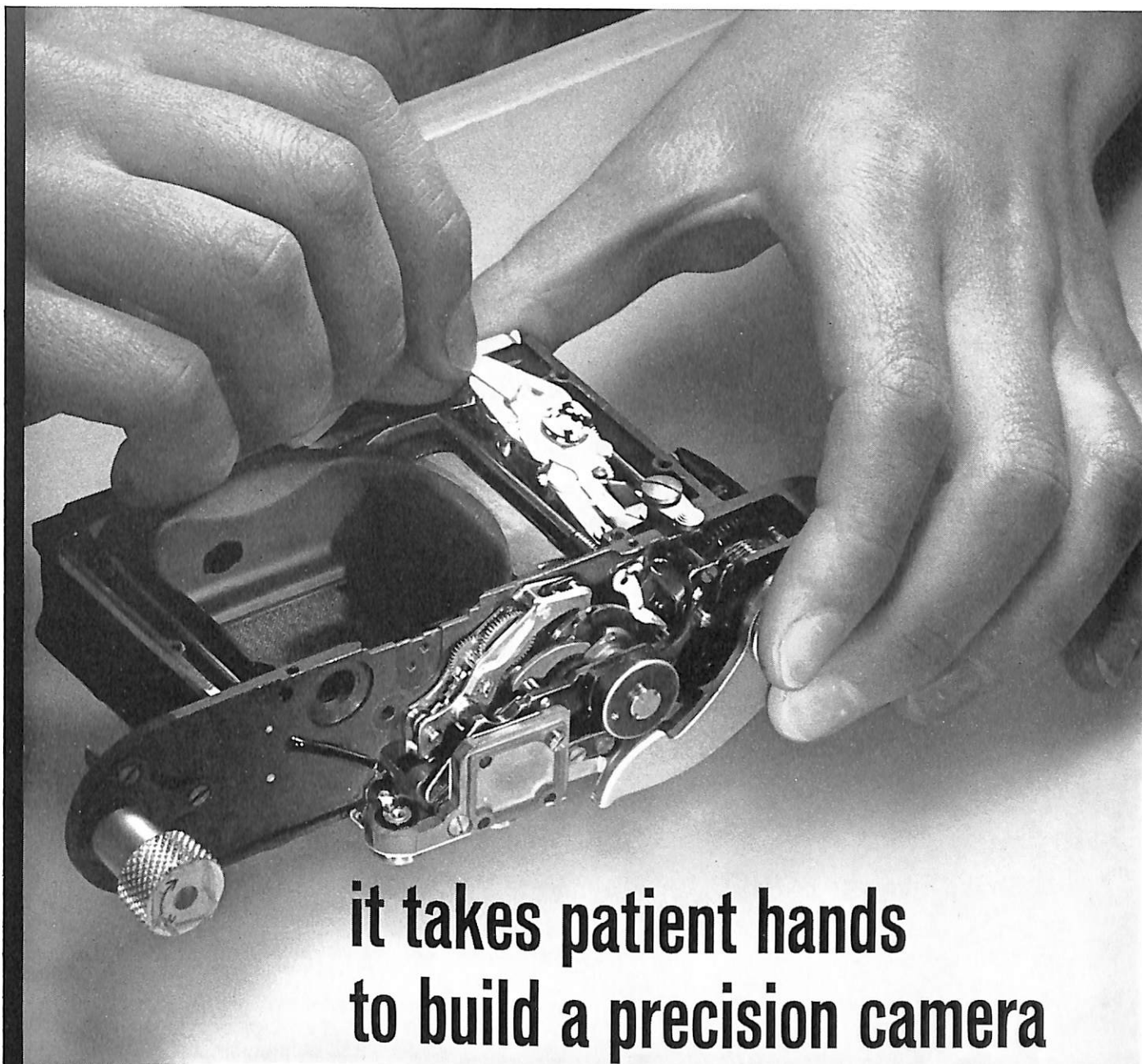
The idea for the recording and its actual execution are the work of Louis Stettner, a young magazine and advertising photographer. He decided, in making the record, to take a portable tape recorder to each photographer's studio and to let the photographer speak at his ease and at any length. No scripts were used. Stettner then holed up with the resulting reels and reels of tape and extracted the most significant of his subjects' remarks for the final version. The result is intimate and "real" to a remarkable degree. And, aside from its immediate interest to photographers, the record could well be an important historical document—the first of its kind. Imagine how fascinating a record of the voices and thoughts of Niépce, Fox Talbot, Hill or Brady would be today, if it existed!

"Famous Photographers Tell How," first of a series of recordings on photography, is available at your dealer, or by mail order from Candid Recordings, 854 Seventh Ave., New York 19, N. Y. Price is \$4.95.

**flash head bracket.** A new and handy Leica accessory for Braun Hobby owners is a flash head bracket. This makes it possible to mount the flash head of any Braun Hobby electronic flash unit on the accessory clip of the camera or Leitz flash angle bracket. Price is \$2.00.

**new tv hero packs 36-shooter.** A different-type TV hero—one who shoots his adversaries with a camera—will bow in on the ABC-TV network on Friday, October 10. "Man With A Camera" will appear over 70 stations across the U.S., sponsored by General Electric's Photo Lamp Department.

The new show is built around the adventures of "Mike Kovac," a free-lance photographer who uses a Leica M-3 to get some of his most exciting pictures. Many of the stories are said to be based on actual experiences of both amateur and professional photographers.



## it takes patient hands to build a precision camera

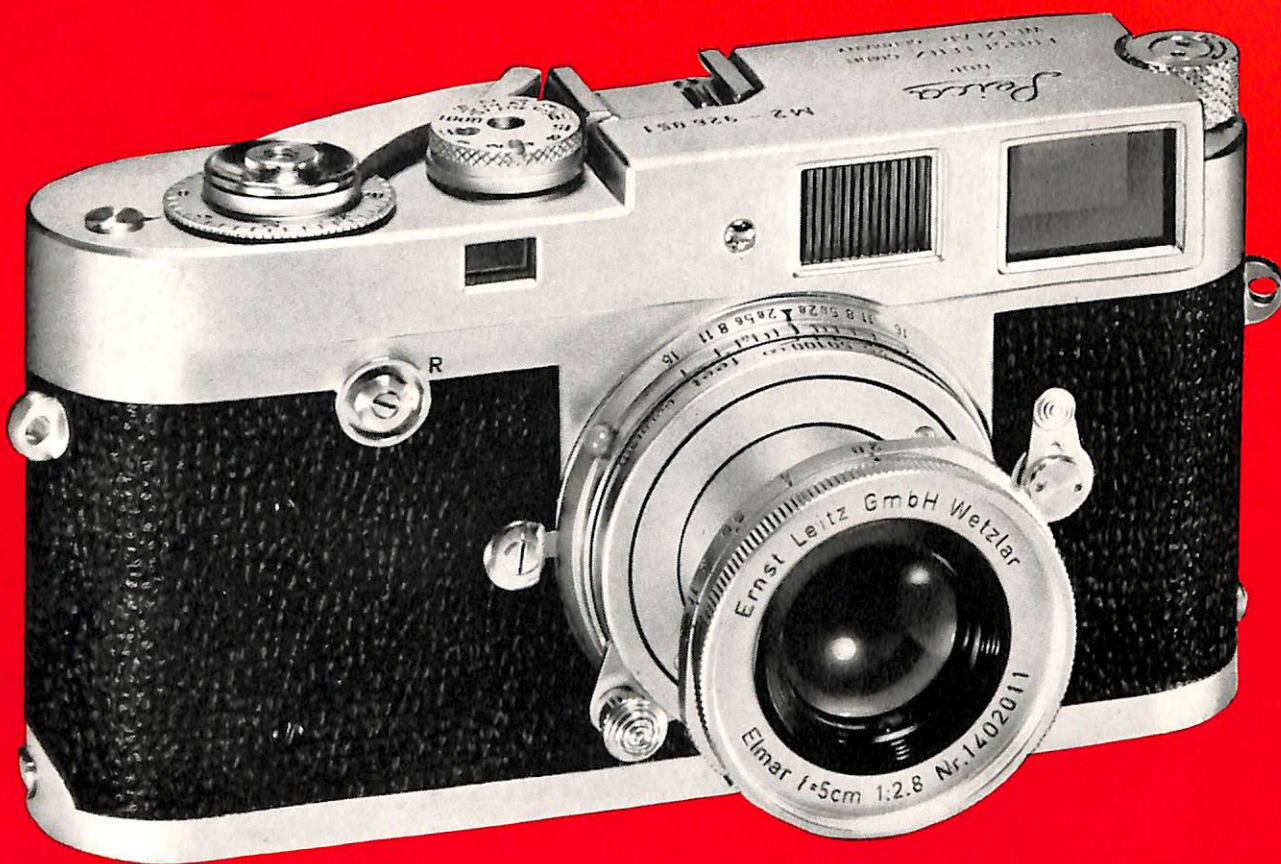
These patient, skilled hands belong to a craftsman in Wetzlar, West Germany. When 848 parts and 5,548 production stages go into a precision 35mm camera with a top-notch lens, hands are important. Automatic machines may turn out even the smallest parts with microscopic exactness, but machines can't do everything—and when it comes to assembly, skilled hands with years of training must take over. These are the hands of a man proud of his responsibility, working on a Leica M-3, incomparable in its precision. The entire M-3 is assembled by hand, as well as such sub-assemblies as the shutter, the rangefinder-viewfinder system, the lenses. The production stages include hundreds of inspections in which critical eyes and expert hands use the finest measuring devices in the world to check tiny tolerances. It all adds up to precision and ruggedness which will last a lifetime.



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# announcing the great new **LEICA M-2**



gives you the many famous Leica features  
**plus built-in wide angle viewing**

at an irresistibly low price

#### *features of the new Leica M-2*

- built-in luminous frame for the wide-angle 35mm lens
- 50mm frame and 90mm frame which appear automatically as lenses are inserted
- single-window viewfinder-rangefinder
- automatic parallax correction throughout
- frame selector
- accepts bayonet-mount Leica lenses
- fast-action advance lever
- automatic flash synchronization
- one shutter dial — 1/1000 second to 1 second and "Bulb"
- release button for rewind
- Leica-meter "MC" couples to M-2 (optional)

the new Leica M-2 with 50mm Elmar f/2.8 (shown above)....\$276.00



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